

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed March 22, 2004. Reconsideration and allowance of the application and pending claims are respectfully requested.

I. Restriction Requirement

The Examiner has required the Applicants to elect to prosecute one of two groups of claims allegedly drawn to distinct inventions. In response to the restriction requirement, Applicants have elected to prosecute claims 13-36 and newly added claims 37 and 38. Applicants hereby acknowledge the Examiner's withdrawal from consideration claims 1-12.

II. Claim Rejections - 35 U.S.C. § 102(a)

A. Statement of the Rejection

Claims 13, 24-30 and 32-36 have been rejected under 35 U.S.C. § 102(a) as allegedly being anticipated by *Newell '356* (U.S. Pat. No. 3,513,356), *Newell '787* (U.S. Pat. No. 3,634,787), or *Nakamura* (U.S. Pat. No. 5,663,505). Applicants respectfully traverse this rejection.

B. The *Newell '356*, *Newell '787*, and *Nakamura* References

Both *Newell* references disclose vibratory members on which layers of piezoelectric material is disposed. (Abstract) The vibratory member may contain active and passive elements such as an integrated circuit with frequency selective properties. (Summary)

The *Nakamura* reference discloses a pressure sensor that includes a vibrator having a diaphragm valve for detecting pressure. (Abstract)

In contrast to Applicants' claimed invention, the *Newell* references and the *Nakamura* reference do not disclose, teach, or suggest a resonator device that comprises a **resonator member having an adjustable resonance frequency** as presently recited in Applicants' claims 13 and 33.

C. Discussion of the Rejection

It is axiomatic that “[a]nticipation requires the disclosure in a single prior art reference of *each element* of the claim under consideration.” *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)(emphasis added). Therefore, every claimed feature of the claimed invention must be represented in the applied reference to constitute a proper rejection under 35 U.S.C. § 102(a).

In the present case, not every feature of the claimed invention is represented in the *Newell* references or the *Nakamura* reference. With regard to independent claims 13 and 33, the Office Action alleges:

Each reference teaches a beam resonator constituted by a piezo element directly positioned on a semi-conductor substrate with a drive or sense electrode disposed on the other side of the piezo element. Note especially Newell '356 (Figs. 1-4, 6 and 7), Nakamura, figs. 1 and 3; and Newell '787 figures 1-5, 7 and 8.

Applicants respectfully submit that neither *Newell '356*, *Newell '787*, nor *Nakamura* disclose a “resonating member having an adjustable resonance frequency,” as recited in claim 13. The *Newell '787* reference, which is a continuation-in-part of *Newell '356*,

nature of the resonance frequency of the vibratory member of the *Newell* references (See col. 8, lines 45-54):

Furthermore, thickness is not critical for longitudinal mode vibration. The resonant frequency is determined almost entirely by length rather than by both length and thickness as in a flexural resonator.

Various useful frequencies would be possible with a longitudinal mode resonator. For instance, a frequency of 1 MHz, which is the center of the broadcast band would require a silicon resonator about one-sixteenth inch long, while 10.7 MHz, the FM IF frequency, would require a length of about 16 mils.

In other words, the resonance frequency disclosed in the *Newell* references is not adjustable, but fixed depending on the length of the vibratory member. Thus, neither *Newell* '356, *Newell* '787, nor *Nakamura* disclose a "resonating member having an adjustable resonance frequency," and thus the rejection to claim 13 should be withdrawn.

Because independent claim 13 is allowable over *Newell* '356, *Newell* '787, and *Nakamura*, dependent claims 14-32 and 37 and 38 are allowable as a matter of law for at least the reason that the dependent claims 14-32 and 37 and 38 contain all elements of their respective base claim. See, e.g., *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

With regard to independent claim 33, Applicants respectfully submit that neither *Newell* '356, *Newell* '787, nor *Nakamura* disclose a "resonating member having an adjustable resonance frequency," as recited in claim 33. As the resonance frequencies of the vibratory members disclosed in the cited references are fixed and not adjustable, *Newell* '356, *Newell* '787, and *Nakamura* fail to anticipate the explicit claim limitations. Thus, Applicants respectfully submit that the rejection to claim 33 should be withdrawn.

Because independent claim 33 is allowable over *Newell* '356, *Newell* '787, and *Nakamura*, dependent claims 34-36 are allowable as a matter of law.

Because independent claim 33 is allowable over *Newell '356*, *Newell '787*, and *Nakamura*, dependent claims 34-36 are allowable as a matter of law.

III. Claim Rejections - 35 U.S.C. § 103(a)

A. Rejection of Claims

1. Statement of the Rejection

Claims 14-23 and 31 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Newell '356*, *Newell '787*, or *Nakamura*. Applicant respectfully traverses this rejection.

2. Discussion of the Rejection

As acknowledged by the Court of Appeals for the Federal Circuit, the U.S. Patent and Trademark Office (“USPTO”) has the burden under section 103 to establish a proper case of obviousness by showing some objective teaching in the prior art or generally available knowledge of one of ordinary skill in the art that would lead that individual to the claimed invention. See *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Accordingly, to make a proper case for obviousness, there must be some prior art teaching or established knowledge that would suggest to a person having ordinary skill in the pertinent art to fill the voids apparent in the applied reference. It is respectfully asserted that no such case has been made in the outstanding Office Action.

The Office Action alleges the following:

Newell and Nakamura teach the basic resonator structure as noted above. They do not explicitly teach an oxide layer over the semiconductor layer, a capacitor, or some specific quality factors.

However, the references (note e-s Newell (356) col. 3 in 51-col. 4 In-16) teach providing an insulator on the semi-conductor with an electric conductor on top of the insulator. Oxides are well known insulators (official notice taken). Standard 1c techniques are used and entire circuits are integrated onto the substrate; thus it is obvious that a capacitor could be so located if it were part of the input/output circuitry. It has long been held that optimization of a known device for a particular application (e.g. via routine experimentation) is within the skill expected of the routineer. Thus, to select various desirable quality factors for the Newell and Nakamura structures would have been obvious to one of ordinary skill in the art.

Applicants respectfully disagree. As described above in the context of the 35 U.S.C. § 102(a) rejection, neither *Newell* '356, *Newell* '787, nor *Nakamura* disclose a “resonating member having an adjustable resonance frequency,” as recited in claims 13 and 33, from which claims 14-23 and 31 depend.

With regard to the allegation that the references teach providing an insulator on the semiconductor, the resulting structure disclosed in the references is not a “semiconductor material of a semiconductor-on-insulator wafer,” as recited in claims 13 and 33, to which claims 14-23 and 31, respectively, depend. The structure disclosed in *Newell* '356 is a semiconductor material acting as a common electrode with an insulator disposed between the semiconductor material and the electrode. That disclosed structure is not a silicon-on-insulator (SOI) wafer as that term is understood in the art.

Further, whether oxides are well-known insulators, or not, does not render the claimed structures obvious, and in fact, Applicants take note of the fact that such an assertion has not been made in the Office Action.

With regard to a capacitor being located in the input and output, no such claim has been made by Applicants. Applicants have amended claim 16 and added claim 37 to

further clarify a resonance adjustable feature and capacitor feature of the claimed inventions. Electrically isolating the semiconductor layer from the handle layer enables the capacitor structure, and thus the variable tuning effect. In one embodiment, the capacitor is borne from the structure of the piezoelectric resonator (or in another embodiment through the disposition of an electrode adjacent to the piezoelectric structure), providing an air-gap, variable capacitance as opposed to a fixed capacitance (the latter of which appears to be what the Office Action is alleging). In other words, the “tuning” capacitor is not added to the input or output of the resonator, unlike what is alleged in the Office Action.

Finally, with regard to the optimization statement and the selectability of desirable quality factors, Applicants respectfully submit that such features as claimed are the result of the unique structures claimed, and not borne from routine experimentation. For example, miniaturization enables higher frequency operation, but such miniaturization poses additional challenges, as evidenced by the voluminous literature and patents on thin-film technology. The claimed performance features are not disclosed, taught, or suggested in the cited references. As such features are a direct result of the innovative structure as claimed, Applicants respectfully submit that the corresponding claims should not be disregarded in determining patentability, and thus respectfully request reconsideration of the dependent claims.

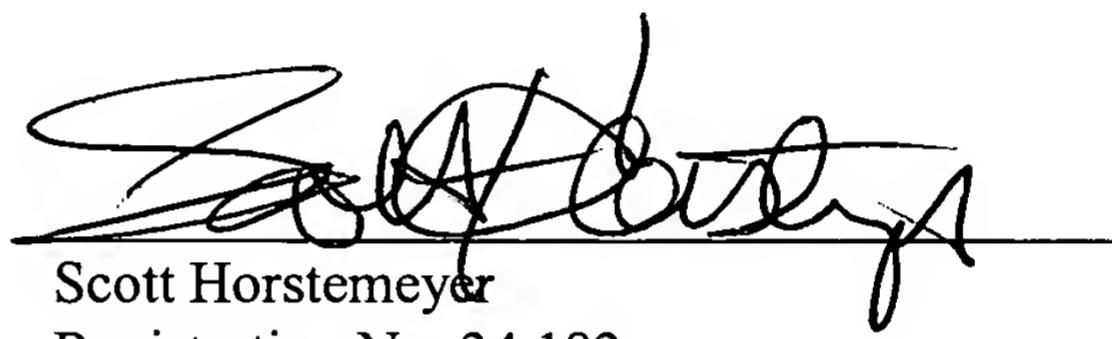
IV. New Claims

As identified above, claims 37 and 38 have been added into the application through this response. Applicants respectfully submit that it is believed that claims 37 and 38 do not encompass new matter, and that these and other claims describe an invention novel and unobvious in view of the prior art of record. Therefore, Applicants respectfully request that these claims be held to be allowable.

CONCLUSION

Applicant respectfully submits that Applicant's pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,



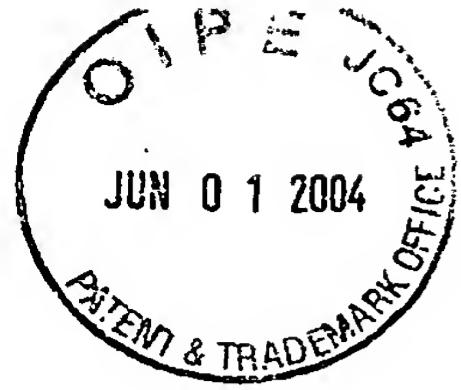
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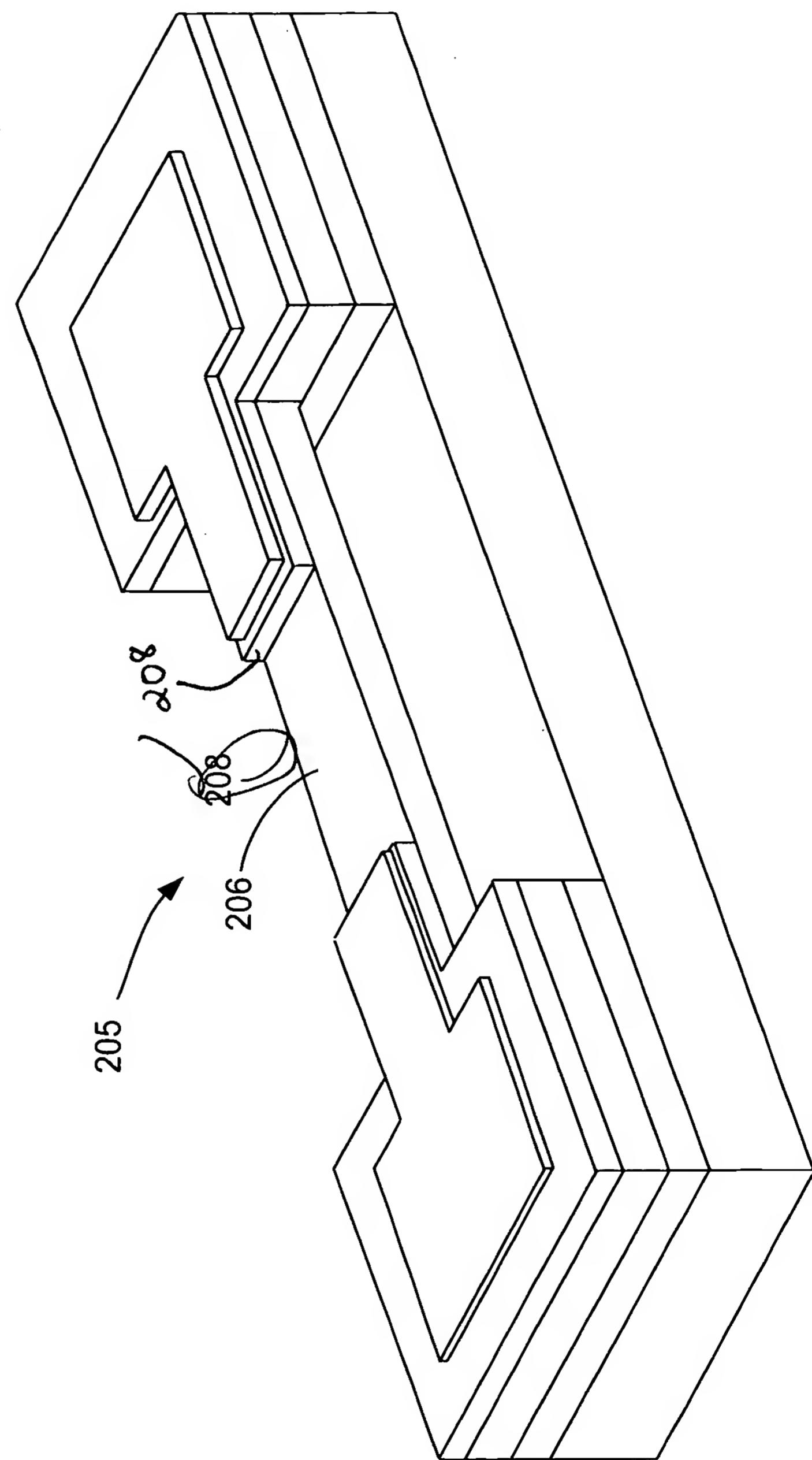


FIG. 2B